

**ORDER**

**DRAFT**  
**DOE O 452.4B**

Approved: XX-XX-XX

# **SECURITY AND USE CONTROL OF NUCLEAR EXPLOSIVES AND NUCLEAR WEAPONS**

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**U.S. DEPARTMENT OF ENERGY**  
**National Nuclear Security Administration**  
**Nuclear Weapon Surety and Quality Division**



## SECURITY AND USE CONTROL OF NUCLEAR EXPLOSIVES AND NUCLEAR WEAPONS

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1. PURPOSE.

This Department of Energy (DOE) Order establishes requirements to implement the nuclear explosive security and use control (UC) elements of DOE O 452.1D, *Nuclear Explosive and Weapon Surety (NEWS) Program*, to ensure authorized use, when directed by proper authority, and protect against deliberate unauthorized acts (DUAs)/deliberate unauthorized use (DUU).

2. CANCELLATION.

This Order cancels DOE O 452.4A, *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 12-17-01. Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract or regulatory commitment is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.

3. APPLICABILITY.

a. Departmental Applicability.

- (1) This Order applies to all those Departmental elements that are involved in performing, managing, overseeing, or directly supporting NEWS or associated activities, including those created after the Order is issued.
- (2) The Administrator will assure that National Nuclear Security Administration (NNSA) employees and contractors comply with their respective responsibilities under this Order. Nothing in this Order will be construed to interfere with the NNSA Administrator's authority under section 3212(d) of Public Law (P.L.) 106-65 to establish Administration specific policies, unless disapproved by the Secretary.

b. DOE Contractors. Except for the equivalencies/exemptions in paragraph 3c, the Contractor Requirements Document (CRD), Attachment 1, sets forth requirements of this Order that will apply to contracts that include the CRD.

c. Equivalencies and Exemptions for DOE O 452.4B.

- (1) Requests for equivalencies and exemptions to this Order must be in memorandum form and sent to the Nuclear Weapon Surety and Quality Division, Office of Military Application and Stockpile Operations.

- (a) The memorandum must briefly justify the reasons for the Equivalencies/Exemptions.
  - (b) The memorandum must reference the offices, or localities, and requirements for which the equivalency/exemption is sought.
- (2) Exemptions. The following Departmental elements are exempted: Office of the Chief Financial Officer, Office of the Chief Information Officer, Office of Civilian Radioactive Waste Management, Office of Congressional and Intergovernmental Affairs, Office of Economic Impact and Diversity, Energy Information Administration, Office of Electricity Delivery and Energy Reliability, Office of Energy Efficiency and Renewable Energy, Office of Environmental Management, Office of Fossil Energy, Office of Hearings and Appeals, Office of Human Capital Management, Office of Intelligence and Counterintelligence, Office of Legacy Management, Office of Management, Office of Nuclear Energy, Office of Policy and International Affairs, Office of Public Affairs, Office of Science, Bonneville Power Administration, Southeastern Power Administration, Southwestern Power Administration, Western Area Power Administration.
- (3) Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at Title 50 United States Code (U.S.C.) sections 2406 and 2511 and to ensure consistency through the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.

#### 4. REQUIREMENTS.

##### a. Application of Nuclear Explosive Surety Standards.

- (1) All nuclear explosives (NEs) and nuclear explosive operations (NEOs) must meet the qualitative Nuclear Explosive Surety Standards (hereafter know as the Standards) set forth in DOE O 452.1D, or its successors, during the DOE/NNSA life cycle.
- (2) The UC element of NE surety includes one unique requirement that is not explicitly captured by the Standards: to ensure use when authorized and directed by proper authority. Because of this unique UC objective, some requirements in this Order emphasize a subset of NEs that are in the fully assembled DoD configuration as NWs.
- (3) The protection of NEs and NWs must include a combination of administrative, process, and technical measures designed to ensure authorized use and prevent deliberate unauthorized use.

- (4) Controls implemented to support the Standards for one part of surety; safety, security or UC, must also be evaluated for adverse impact on each of the other surety parts.
  - (5) In the context of the standards, “prevent” implies an absolute assurance, which cannot be guaranteed and is rarely achievable. Nonetheless, prevention of unintended/unauthorized nuclear detonation and unintended main charge high explosive (HE) detonation/deflagration is a primary goal in the design and performance of nuclear explosive operations. The objective is to drive the likelihood of the specified consequences as low as reasonably practicable.
- b. Nuclear Explosive Security. NNSA implements Departmental requirements in accordance with the 470-series directives. Safeguards and security measures must be documented in the site safeguards and security plan. The Nuclear Explosive Security Standards from DOE O 452.1D, must be met to ensure adequate nuclear explosive security for all NEOs conducted by the Department and its contractors.
- c. Nuclear Explosive and Nuclear Weapon Use Control. NNSA implements Departmental requirements in accordance with this directive. Joint DOE/NNSA and DoD directives relating to policies, requirements and technical procedures for handling and controlling logistics code and key material are implemented by Technical Manual TP 50-2, *Procedures for the Use and Control of Logistics Codes and Permissive Action Link (PAL) Equipped Weapons*.
- d. Nuclear Explosive and Weapon Security and Use Control Program. Consistent with the Standards, there must be a Nuclear Explosive and Weapon Security and Use Control Program (hereafter known as the Program) consisting of an integrated system composed of design; review; installation; and production of features, devices, and other measures to maintain control of NEs and NWs at all times. The Program ensures use when authorized and directed by proper authority and protects against deliberate unauthorized acts (DUAs)/deliberate unauthorized use (DUU). Program elements related to NW design must be consistent with DoD operational requirements.

The Program must include the following major elements:

- (1) security and UC measures for NEs and NWs, including design features that are incorporated and used at the earliest practical point during assembly and removed at the latest practical point during disassembly or dismantlement;
- (2) security and UC upgrades will be implemented during weapon retrofit/alteration/refurbishment for all NWs, unless there are documented overriding reasons for not doing so;

- (3) design attributes, that may include a combination of administrative and technical measures, designed to prevent or delay DUU of NEs and NWs;
- (4) the Human Reliability Program (HRP) as required by Title 10 Code of Federal Regulations (CFR) Part 712, to ensure the reliability of DOE and contractor employees who require access to designated components, NEs or NWs;
- (5) measures to prevent DUA from degrading the effectiveness of UC measures incorporated in or used for NEs or NWs;
- (6) measures to prevent or delay DUU, DUA, or loss of control (LOC) during planned NEOs;
- (7) measures to assist the recapture and recovery (R&R) of lost or stolen NEs or NWs;
- (8) stockpile surveillance to ensure that UC devices and components meet specified requirements and are performing effectively;
- (9) DUA/DUU evaluations performed periodically that may be specific to a DOE nuclear weapon, NE, NEO, class of operations, or a facility or site;
- (10) measures that must be continually assessed against existing and emerging threats as well as technological opportunities for improvement; and
- (11) Research and Development (R&D) (described in paragraph 4c below).

e. Research and Development (R&D). Consistent with the standards and the Program, DOE/NNSA must provide resources and conduct R&D for security and UC measures that can protect against DUA/DUU of NEs and NWs. Recommendations from these R&D activities are provided for use by project managers, project teams, project officer groups, and decision-makers within DOE/NNSA. Specifically, security and UC R&D must:

- (1) pursue technologies that can enhance security and UC for new and existing systems;
- (2) pursue technologies that render the unauthorized use of U.S. nuclear weapons impossible without their remanufacture;
- (3) develop nuclear weapon measures to provide assurance of operation when authorized for use;
- (4) design nuclear weapon features that enhance secure critical command and control communications; and
- (5) develop technologies to aid in the R&R of weapons.

- f. DUA/DUU Evaluations. The evaluations must be performed for DOE/NNSA NEs, NWs, and NEOs to help ensure that DUA/DUU controls are adequate. The controls must be periodically evaluated and documented against all existing and emerging threats and technological advancements. The evaluations assess the controls as they apply to the critical component, NE, or NW to ensure that they meet the DOE O 452.1D Nuclear Explosive Surety Standards. In the context of this Order, the DUA/DUU Evaluations do not include non-malevolent unauthorized acts. These non-malevolent acts are adequately covered by the NE Safety, Quality and Surveillance programs.
  - (1) NNSA Sites with NEOs. The DUA/DUU evaluations are comprised of two distinct processes: Deliberate Unauthorized Use Integration Team (DUUIT) and Deliberate Unauthorized Use Review Team (DUURT), and will apply the NEO DUU criteria and address NEO processes, testers, tooling, and facilities to help ensure that controls are adequate to meet the DOE O 452.1D Nuclear Explosive Surety Standards. Additional direction for the conduct of DUA/DUU evaluations will be issued in a supplemental directive by the NNSA Administrator.
  - (2) NNSA Sites without NEOs. The DUA/DUU evaluations will address DOE designs and production to help ensure the integrity of product used in NEs and NWs are adequate to meet the DOE O 452.1D Nuclear Explosive Surety Standards. Additional direction for the conduct of DUA/DUU evaluations will be issued in a supplemental directive by the NNSA Administrator.
- g. Joint DOE and DoD DUU Protection. DOE/NNSA will cooperate with DoD and other Federal agencies as required to provide protection against DUU and to assess the effectiveness of surety features for all U.S. nuclear weapon systems throughout their life cycles. These features must be consistent with DoD operational requirements and must continually be assessed against existing and emerging threats as well as technological opportunities for improvement.
- h. Command and Control. DOE/NNSA will assist DoD in designating nuclear command and control critical equipment and components to ensure that these items are developed and maintained to meet the criteria designated in National Security Directives and the Program above.

5. RESPONSIBILITIES.

- a. Associate Administrator for Emergency Operations.

Establishes programs for coordinating and assisting DoD and other Federal agencies in the R&R of U.S. NEs or NWs for which physical control has been lost.

b. Associate Administrator for Security Programs.

Advises the Assistant Deputy Administrator for Science, Engineering and Production Programs on safeguards and security requirements to implement the security element of the surety standards as defined in the DOE NEWS Program.

c. Assistant Deputy Administrator for Science, Engineering and Production Programs.

- (1) Oversees the management and integration of all aspects of the Program.
- (2) Represents the Office of Defense Programs in coordinating and assisting DoD and other Federal agencies in the R&R of U.S. NEs or U.S. NWs for which physical control has been lost.
- (3) Represents DOE/NNSA regarding U.S. NWs and U.S. NW systems UC to DoD and other Federal agencies.
- (4) Ensures active and continuous review of the nuclear stockpile is being conducted to identify Program concerns and ensures implementation of stockpile improvement or controls to address identified concerns.
- (5) Directs assessment of the effectiveness of UC features of U.S. NWs in DOE and DoD custody.

d. Office of Research and Development for National Security Science and Technology.

- (1) Manages the R&D aspects of the Program.
- (2) Conducts R&D on a broad range of surety methods and devices to significantly improve the security and UC of nuclear weapons and nuclear weapon systems.
- (3) Establishes security and UC priorities for R&D efforts and resources.
- (4) Allocates resources and pursues UC options with delay or denial capability that, at a minimum, are equivalent to that associated with current nonviolent disablement systems.
- (5) Allocates resources and pursues technologies that render the unauthorized use of U.S. nuclear weapons impossible without their remanufacture.
- (6) Allocates R&D resources and directs R&D of controls to prevent DUA/DUU of NEs and NWs.
- (7) Works with the Office of Military Application and Stockpile Operations to establish programs to incorporate improved UC measures in the stockpile.



e. Office of Military Application and Stockpile Operations.

- (1) Manages all aspects of the Program with the exception of R&D.
- (2) Assists DoD and other Federal agencies in designating nuclear command and control critical equipment and ensuring that it is developed to meet criteria specified in National Security Directives.
- (3) Works with the Office of Research and Development for National Security Science and Technology to establish programs to incorporate improved UC measures in the stockpile and promote those programs found to be cost effective and feasible.
- (4) Periodically evaluates and documents existing and emerging threats and technological advancements associated with DUA/DUU.

f. Assistant Deputy Administrator for Secure Transportation.

- (1) Ensures active and continuous review of the aspects of the Program under his/her purview is being conducted to identify Program concerns and ensures implementation of improvement or controls to address identified concerns.
- (2) Assesses the effectiveness of the integrated system of controls to protect NEs and NWs under his/her cognizance against DUU.
- (3) Periodically evaluates and documents existing and emerging threats and technological advancements associated with DUA/DUU.

g. Assistant Deputy Administrator for Nuclear Safety and Operations

- (1) Ensures active and continuous review of the aspects of the Program under his/her purview is being conducted to identify Program concerns and ensures implementation of improvement or controls to address identified concerns.

h. Managers of NNSA Site Offices.

- (1) Ensure implementation of the Program.
- (2) Conduct annual Program reviews of the programs under their purview for the Assistant Deputy Administrator for Science, Engineering and Production Programs, the Assistant Deputy Administrator for Secure Transportation, the Assistant Deputy Administrator for Nuclear Safety and Operations and other DOE senior-level managers.
- (3) Ensure (based on competent, independent reviews) that each NEO authorized meets the DOE O 452.1D Nuclear Explosive Surety Standards.

Retain documentation of these reviews, their conclusions, and resolution of findings.

- (4) Notify contracting officers of which contracts are affected by the CRD to this Order.

i. Nuclear Weapon Surety and Quality Division.

- (1) Responsible for establishing NE, NW, and NEO security and UC policy and requirements.
- (2) Manages the NNSA DUURT evaluation processes.
- (3) Maintains this Order.

j. Nuclear Weapons Stockpile Division.

- (1) Develops implementing procedures for security and UC policy specified in this Order.
- (2) Manages the NNSA DUUIT processes.
- (3) Ensures implementation of Program, including DOE O 452.1D Nuclear Explosive Surety Standards, into the process development of nuclear explosives, nuclear weapons, and NEOs.

- k. Contracting Officers. Once notified, contracting officers are responsible for incorporating the CRD of this Order into each affected contract.

6. DEFINITIONS. Selected definitions from DOE O 452.1D are repeated here for ease of reference.

- a. Delay. The effect achieved by physical features, technical devices, security measures, or protective forces that impedes an adversary from gaining access to an asset being protected or from completing a malevolent act.
- b. Deliberate Unauthorized Act (DUA). Any intentional action that has not been authorized and approved by proper authority.
  - (1) In the context of the nuclear explosive surety standards, a DUA is one that is not sanctioned as part of an approved nuclear explosive operation or associated activity, but which could affect a NEO or main charge high-explosive part collocated with a pit.
  - (2) In the context of this Order, a DUA is of interest if it is performed with a malevolent intent to prevent authorized use of a NW; create a nuclear detonation or other DUU; or to gain unauthorized control of a NE.

- c. Deliberate Unauthorized Use (DUU). Any of the following consequences resulting from deliberate malevolent acts:
  - (1) a nuclear detonation not authorized by proper authority;
  - (2) a high-explosive detonation or deflagration that could result in an unauthorized nuclear detonation or fissile material dispersal from a pit; or
  - (3) theft of nuclear explosives.
- d. Facility. Any equipment, structure, system, process, or activity that fulfills a specific purpose.
- e. Measures. The total spectrum of characteristics, devices, equipment, procedures, and administrative processes used to increase the difficulty of or add to the delay in achieving the deliberate unauthorized use of a nuclear explosive.
- f. Nuclear Command and Control Critical Equipment. Specifically designated equipment, including software, used to build, encode, decode, transmit, or receive emergency action messages; identify nuclear targets, select nuclear weapons to be used against specific targets, and route nuclear-weapons-carrying platforms to appropriate launch points; and support or inhibit the delivery, arming, fusing, and firing of nuclear weapons themselves. This equipment includes positive control material and devices and NWs hardware.
- g. Nuclear Explosive. An assembly containing fissionable and/or fusionable materials and main charge high-explosive parts or propellants capable of producing a nuclear detonation (for example, a nuclear weapon or test device).
- h. Nuclear Explosive Operation (NEO). Any activity involving a nuclear explosive including activities in which main charge high-explosive parts and pit are collocated.
- i. Nuclear Weapon. A nuclear explosive configured for Department of Defense use.
- j. Recapture. Locating and/or regaining control of a NW and/or special nuclear material that is under unauthorized possession while still within the confines of a DOE site/facility.
- k. Recovery. Locating and/or regaining control of a NW and/or special nuclear material that is under unauthorized possession and has been removed from within the confines of a DOE site/facility or DOE possession.
- l. Security. An integrated system of activities, systems, programs, facilities, and policies for the protection of classified information and/or classified matter, unclassified controlled information, nuclear materials, nuclear weapons, nuclear weapon components, and/or the DOE's and its contractors' facilities, property, and equipment.

- m. Use Control. The application of systems, devices, or procedures that ensure timely authorized use of a nuclear explosive while precluding or delaying unauthorized nuclear detonation.
- n. Use Denial. The UC measures that, given access, delay or prevent an unauthorized nuclear detonation.

7. REFERENCES.

- a. Human Reliability Program rule, 10 CFR Part 712, the rule that defines a security and safety reliability program designed to ensure that individuals who occupy positions affording access to certain materials, nuclear explosive devices, facilities, and programs meet the highest standards of reliability and physical and mental suitability.
- b. National Security Presidential Directive 28, United States Nuclear Weapons Command and Control, Safety, and Security, dated 06-20-03, which mandates stringent standards for nuclear weapons safety, security, and use control. Provides for the attainment and maintenance of a nuclear command and control system under the authority and direction of the Commander in Chief.
- c. Joint Policy Statement on Nuclear Weapons Surety, dated 6-27-91, signed by the Secretaries of Defense and Energy.
- d. Memorandum of Understanding Between the Department of Defense and Department of Energy on Objectives and Responsibilities for Joint Nuclear Weapon Activities, dated 1-17-83, which supplements previous agreements delineating DoD and DOE objectives, responsibilities, and measures to improve stockpile planning and acquisition and ensuring high-level attention to nuclear weapon safety, security, and use control.
- e. Technical Manual TP 50-2, *Procedures for the Use and Control of Logistics Codes for Permissive Action Link (PAL) Equipped Weapons*, is a joint DOE and DoD directive that provides the policies, requirements and technical procedures for handling and controlling of logistics code and key material.
- f. DOE O 151.1C, *Comprehensive Emergency Management System*, dated 11-2-05, which establishes objectives, responsibilities, and requirements for a system that encompasses emergency planning, preparedness, readiness assurance, response, and recovery actions.
- g. DOE O 226.1A, *Implementation of Department of Energy Oversight Policy*, dated 7-31-07, which provides direction for implementing DOE P 226.1A, Department of Energy Oversight Policy, dated 5-25-07, which establishes DOE policy for assurance systems and processes established by DOE contractors and oversight programs performed by DOE line management and independent oversight organizations.

- h. DOE O 243.1, *Records Management Program*, dated 2-3-06, and National Archives and Record Administration-approved DOE records schedules, which describe requirements for managing records related to this program.
- i. DOE O 251.1C, *Departmental Directives Program*, dated 1-15-09, which details the process for requesting exemptions from directives requirements.
- j. DOE O 452.1D, *Nuclear Explosive and Weapon Surety Program*, dated 04-14-09, which establishes DOE objectives, standards, criteria, authorities, and responsibilities for the Nuclear Explosive and Weapon Surety Program.
- k. DOE O 452.2D, *Nuclear Explosive Safety*, dated 04-14-09, which establishes DOE objectives, requirements, and responsibilities for the safety of DOE nuclear explosive operations.
- l. DOE M 452.4-1A, *Protection of Use Control Vulnerabilities and Designs*, dated 3-11-04, establishes a general process and provides direction for controlling access to and disseminating Sigma 14 and 15 nuclear weapon data (NWD) at DOE.
- m. DOE M 452.2-2, *Nuclear Explosive Safety Evaluation Processes*, dated 04-14-09, details the administrative and procedural requirements for nuclear explosive safety evaluations of nuclear explosive operations conducted by the DOE/NNSA and its contractors.
- n. DOE O 452.6A, *Nuclear Weapon Surety Interface with the Department of Defense*, dated 04-14-09, establishes Department of Energy (DOE) and National Nuclear Security Administration (NNSA) requirements and responsibilities for addressing joint nuclear weapon and nuclear weapon system surety activities in conjunction with the Department of Defense (DoD).
- o. DOE O 461.1A, *Packaging and Transfer or Transportation of Materials of National Security Interest*, dated 4-26-04, which establishes the DOE requirements and responsibilities and implements the management and operation of the Transportation Safeguards System.
- p. DOE P 470.1, *Integrated Safeguards and Security Management (ISSM) Policy*, dated 5-8-01, which provides a formal, organized process for planning, performing, assessing, and improving the secure conduct of work in accordance with risk-based protection strategies.
- q. DOE O 470.2B, *Independent Oversight and Performance Assurance Program*, dated 10-31-02, establishes requirements and responsibilities for the DOE Independent Oversight and Performance Assurance Program that provides DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and the effectiveness of line management performance in safeguards and security and other critical functions.

- r. DOE O 470.3B, *Graded Security Protection Policy*, dated 8-12-08, classified.
  - s. DOE O 470.4A, *Safeguards and Security Program*, dated 5-25-07, which establishes basic requirements and responsibilities for the DOE Safeguards and Security Program.
  - t. DOE M 470.4-4A, *Information Security Manual*, dated 1-16-09, establishes security requirements for the protection and control of information and matter required to be classified or controlled by statutes, regulations, or DOE directives. The information security program includes Classified Matter Protection and Control (CMPC); Operations Security (OPSEC); Technical Surveillance Countermeasures (TSCM); security of Foreign Government Information (FGI) and Sensitive Compartmented Information (SCI); security of special access programs; and that unclassified information that must be controlled by statutes, regulations, or DOE directives, generally referred to as unclassified controlled information.
8. CONTACT. Questions concerning this Order should be addressed to the Nuclear Weapons Surety and Quality Division, 202-586-5624.

BY ORDER OF THE SECRETARY OF ENERGY:

DANIEL B. PONEMAN  
Deputy Secretary

**CONTRACTOR REQUIREMENTS DOCUMENT**  
**DOE O 452.4B, *Security and Use Control of Nuclear Explosives and Nuclear Weapons***

This Contractor Requirements Document (CRD) establishes the requirements for Department of Energy (DOE) contractors, including National Nuclear Security Administration (NNSA) contractors, whose contracts involve the performance, management, oversight, or direct support of DOE/NNSA nuclear explosive operations (NEOs) or associated activities.

Regardless of the performer of the work, the contractor is responsible for compliance with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontracts at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

All contractors with this CRD incorporated in their contracts must comply with the following requirements.

1. **NUCLEAR EXPLOSIVE AND WEAPON SECURITY AND USE CONTROL PROGRAM.** The Nuclear Explosive and Weapon Security and Use Control Program (hereafter known as the Program) comprises an integrated system of devices, design techniques, evaluations, and other methods to maintain control of NEs and NWs at all times. These use control (UC) measures allow use when authorized and directed by proper authority and protect against Deliberate Unauthorized Use (DUU). Contractors must ensure that their Programs include the following:
  - a. the Human Reliability Program (HRP) as required by Title 10 Code of Federal Regulations (CFR) Part 712, to ensure the reliability of Department of Energy (DOE) and contractor employees who require access to designated components, nuclear explosives (NE) or nuclear weapons (NW);
  - b. UC measures for NEs and NW, including design features that are incorporated and used at the earliest practical point during assembly and removed at the latest practical point during disassembly or dismantlement;
  - c. UC capabilities for all NWs upgraded to meet current surety requirements during weapon retrofit/alteration/refurbishment, unless there are overriding reasons for not doing so;
  - d. design attributes, that may include a combination of administrative and technical measures, designed to prevent or delay DUU of NWs or NEs;
  - e. UC measures to prevent DUU/ Deliberate Unauthorized Acts from degrading the effectiveness of UC measures incorporated in or used for NEs or NWs;
  - f. UC measures to prevent or delay DUU, DUA, or loss of control (LOC) during planned NEOs;

- g. measures to assist the recapture or recovery of lost or stolen NEs or NWs;
- h. stockpile surveillance to ensure that UC devices and components meet specified requirements and are performing effectively;
- i. DUA/DUU evaluations performed periodically that may be specific to a DOE nuclear weapon, nuclear explosive, nuclear explosive operation, class of operations, or a facility or site; and
- j. measures that must be continually assessed against existing and emerging threats as well as technological opportunities for improvement.

2. APPLICATION OF DOE NUCLEAR EXPLOSIVE SURETY STANDARDS.

- a. Contractors must ensure that all nuclear explosives (NEs) and nuclear explosive operations (NEOs) meet the qualitative Nuclear Explosive Surety Standards (hereafter know as the Standards) set forth in DOE O 452.1D, or its successors, during the DOE/NNSA life cycle.
- b. Contractors must comply with the UC element of NE surety that includes the unique requirement not explicitly captured by the Standards: to ensure use when authorized and directed by proper authority. Because of this unique UC objective, some requirements in this Order emphasize a subset of NEs that are in the fully assembled DoD configuration as NWs.
- c. Contractor protection of NEs and NWs must include a combination of administrative, process, and technical measures designed to ensure authorized use and prevent deliberate unauthorized use.
- d. Contractors must ensure that controls implemented to support the Standards for one part of surety; safety, security or UC, are also evaluated for adverse impact on each of the other surety parts.

3. NUCLEAR EXPLOSIVE SECURITY. NNSA and its contractors implement Departmental requirements in accordance with the 470-series directives. Safeguards and security measures must be documented in the site safeguards and security plan. The Nuclear Explosive Security Standards from DOE O 452.1D, must be met to ensure adequate nuclear explosive security for all NEOs conducted by the Department and its contractors

4. NUCLEAR EXPLOSIVE AND NUCLEAR WEAPON USE CONTROL. NNSA and its contractors implement Departmental requirements in accordance with this directive. Joint DOE/NNSA and DoD directives relating to policies, requirements and technical procedures for handling and controlling logistics code and key material are implemented by Technical Manual TP 50-2, *Procedures for the Use and Control of Logistics Codes and Permissive Action Link (PAL) Equipped Weapons*.



5. RESEARCH AND DEVELOPMENT (R&D). Design Agency contractors must conduct R&D for UC measures that can protect against DUA/DUU of NEs and NWs. The nuclear weapons design laboratories (Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories) must conduct research and development on a broad range of security and UC methods and devices for nuclear explosives and nuclear weapons. Surety recommendations and priorities are intended to provide guidance for project managers, project teams, project officer groups, and decision-makers.
  - a. UC options equivalent to that associated with current use control requirements for new systems must be implemented during new weapon development programs to provide integrated delay or denial capabilities for the overall nuclear weapon system, which does not require direct human intervention.
  - b. Pursue technologies that render the unauthorized use of U.S. nuclear weapons impossible without their remanufacture must be used.
  - c. Nuclear weapon design measures must provide assurance of operation when authorized for use.
  - d. Nuclear weapon design features must support secure critical command and control communications.
  - e. Technologies to aid in the recapture and recovery (R&R) of weapons must be demonstrated and evaluated for integration in DOE NEs/NWs to minimize the overall DUU risk associated with the weapons.
6. DUA/DUU EVALUATIONS. Contractors must have DUA/DUU evaluations performed on their designs and production activities to ensure that their controls are adequate and are performed. The controls must be periodically evaluated and documented against all existing and emerging threats and technological advancements. The evaluations assess the controls as they apply to the critical component, NE, or NW to ensure that each class of operation meets the Security and Control Standards as defined in Security and Control Standards above. Additional direction for the conduct of DUA/DUU evaluations will be issued in a supplemental directive by the NNSA Administrator.
7. CONTROL CRITERIA AND METHODS. Contractors must ensure that control criteria and methods, determined by Defense Programs/NNSA to be appropriate, will be integrated into the process design for NEOs.
8. JOINT DOE AND DEPARTMENT OF DEFENSE (DOD) DUU PROTECTION. Contractors will cooperate with DOE, DoD and other Federal agencies as required to provide protection against DUU and to assess the effectiveness of surety features for all U.S. nuclear weapon systems throughout their life cycles. These features must be consistent with DoD operational requirements and must continually be assessed against existing and emerging threats as well as technological opportunities for improvement.

9. COMMAND AND CONTROL. Contractors will assist DoD in designating nuclear command and control critical equipment and components to ensure these items are developed and maintained to meet the criteria designated in National Security Directives.
10. RECORDS. Contractors will maintain records according to National Archives and Records Administration-approved DOE or site-specific records retention schedules.